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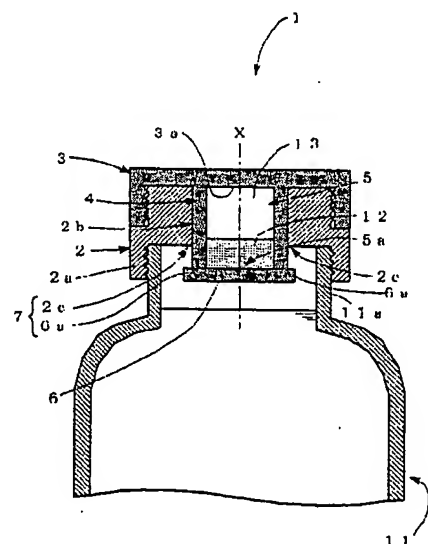
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(54) Closure member for a bottle

(57) A bottle cap or closure member has a first fixed portion 2 and a second movable portion 3 which are separably screwed to each other. The fixed portion is for supporting the movable portion and has an attaching portion 2a for connection to the neck 11a of a bottle 11 and a through hole 2b on an axial line X. The removable portion has an inner plug portion 4 which protrudes from a face 3a thereof on the axial line and passes through and seals the through hole. The inner plug portion is provided with a chamber 5 for raw material 12 and pressurised gas 13. An opening 5a at the other end of the chamber is sealed by a plug 6. Between the plug and the fixed portion, there exists a plug opening means 7 and the plug is arranged to be opened by the plug opening means during relative movement of the fixed portion and the removable portion.

Fig. 1



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## Description

### Background of the Invention

### Technical field of the invention

[0001] The present invention relates to a cap or closure member for a bottle which encloses therein a liquid such as a refreshing drink, mineral water, an alcoholic drink, a milk drink and the like.

### Prior art

[0002] Environmental pollution is increasing at present and the quality of water is deteriorating considerably. Without a severe sterilization treatment, water cannot be used for drinking as it is. However, city water which has been sterilized excessively is, because of its peculiar medicinal smell, not selected for drinking. So, as an alternative to city water, recently bottled water contained in, for example, plastic bottles has come into widespread use.

[0003] These bottled drinks are almost all, with the exception of mineral water, supplied to consumers, after a liquid and raw material has been mixed in a factory.

[0004] However, in a bottled drink comprising a liquid and a raw material which have been previously mixed, the raw material can undergo oxidation, deterioration, rot, brownishness, etc, under the influence of the air temperature, ultraviolet rays, oxygen in the air enclosed in a bottle, or the like, and it is difficult to maintain the freshness and taste of the newly-made drink up until the sell-by date of the product.

[0005] Accordingly, as a means to prevent raw material from undergoing oxidation and the like prior to the drink being consumed, it has been proposed, for example, in Japanese (Utility Model Publication Nos. 50-18846, 50-18848, to provide bottles having a chamber between a cap and an inner plug.

[0006] According to these bottles, when a cap is removed from the bottle an inner plug remains at the top of the bottle, a member for opening and closing which hangs from the back of the top wall of the cap parts from the bottom of the inner plug, a leak provided in the bottom is opened, and raw material enclosed in the chamber between the cap and the inner plug is discharged into the bottle.

[0007] Therefore, by enclosing liquid and raw material in a bottle and chamber respectively, and transferring the bottle from a manufacturer to a consumer, it can be arranged that the raw material and the liquid are mixed only when a consumer opens the cap to use the bottle. Deterioration etc of raw material under the air temperature and ultraviolet rays during transferring are prevented.

[0008] However, even with a bottle having a chamber between a cap and an inner plug, it has been difficult to prevent oxidation, brownishness, aging and deteriora-

tion of the raw material enclosed in a chamber by contact with oxygen in the air enclosed in the chamber. Further, discharging through a leak in an inner plug relies on dead load of raw material, there is a possibility of not achieving a smooth discharge on account of the clogging etc. of a leak by solidification of raw material.

[0009] Therefore, the present invention aims to provide a closure member for a bottle which can supply a consumer with a bottled drink composed of raw material and liquid, and maintain the initial freshness of the product without deterioration of the raw material, and which can smoothly make raw material and liquid be mixed.

### Summary of the Invention

[0010] A first closure member for a bottle relating to the present invention is provided with a fixed portion and a movable portion which are separably screwed with each other.

[0011] The fixed portion is for supporting the movable portion and has an attaching portion to an opening of a bottle and a through hole on an axial line.

[0012] The movable portion has an inner plug portion which protrudes from a face thereof on the axial line and passes through the hole.

[0013] The inner plug portion is provided with a chamber for raw material and pressurised gas. An opening plane at the other end of the chamber is sealed by a plug. Between the plug and the fixed portion, there exists a plug opening means and the plug is to be opened by the plug opening means during relative movements of the fixed portion and the movable portion.

[0014] According to the first bottle cap, as the inner plug portion has a chamber for raw material and pressurised gas, and an opening at the other end of the chamber is sealed with a plug, raw material charged in the chamber is isolated from air by pressure gas and is not subject to oxidation, deterioration etc, which are caused by contact with oxygen in the air. Therefore, it can be supplied to a consumer, keeping the freshness of its moment of production. Also, as a plug opening means exists between a plug and a fixed portion, and the plug is to be opened by the plug opening means during relative movements of the fixed portions and the movable portions, when opening the bottle, the chamber can easily be opened by rotating the movable portion. At this time, raw material is discharged by means of pressurised gas charged therein, so that release of the material from the chamber can be achieved smoothly.

[0015] The second closure member relating to the present invention is the same structure as of the said first, and its material is either of PE (polyethylene) or PP (polypropylene).

[0016] According to the second closure member, in addition to the effects brought by the first closure member, as the material is PE or PP, it can easily be recycled. Further, by recycling, the problem of producing dioxin during incineration, which occurred with former bottle

caps made of PVC can be solved.

[0017] The third closure member relating to the present invention is the same structure as of the said first closure member, and its material is either PET (Polyethylene-terephthalate) or aluminium.

[0018] According to the third closure member, in addition to the effects brought by said first closure member, as material is PET or aluminium, by recycling, it can bring same effects as of said second closure member. Further, cyclical efficiency can be raised because the closure member and bottle can be made of the same material and collected as a single item without the need to remove the closure element.

[0019] Preferably, said plug opening means comprises a flange projecting radially from the plug and a peripheral portion of the through hole which obstructs passage of the flange during opening of the closure member.

[0020] In this case, as the plug opening means is simple in structure, it can reduce cost, and simplify the manufacturing process.

[0021] The peripheral portion may comprise a pin member protruding axially of the closure member.

[0022] In this case, by only rotating the removable member slightly, the chamber can rapidly be opened.

[0023] The plug opening means may comprise a connecting member which connects the first portion with the plug.

[0024] In this case, the plug which rises with the rotation of the removable portion, can be opened by the tension of the connecting member. Also, after the opening process, as the plug is connected to the fixed portion by the connecting member, it can be prevented from dropping into the liquid in the bottle.

[0025] Preferably, said pressurised gas is an inert gas.

[0026] In this case, it can maintain a safe quality of the raw material.

[0027] Preferably, said pressurised gas is one which is chosen from Nitrogen, Helium, Argon, CO<sub>2</sub>, NO or a mixture of two or more of these gases.

[0028] In this case, it is obtainable easily at low cost as an article on the market and cost can be reduced.

[0029] The raw material may be a powder and one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, fruit juice extract, dairy products, alcohol, vegetable extract, vitamins, sugar, herbs or fermented bacilli.

[0030] In this case the raw material is easily handled and can rapidly be mixed with liquid. Also, by using raw materials of many kinds, the application range of the closure member can be extended.

[0031] Here, enriched mineral is, for example, the four main minerals of magnesium, sodium, potassium and calcium. Healthy food is, for example, chitosan, agarics, *rakanka*, ginseng. Fermented bacilli, for example, *yoghurt bacilli* and *yakult bacilli*.

[0032] The raw material may be solid and one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, fruit juice extract, or dairy products.

[0033] In this case, the raw material is very easily handled and easily charged into the chamber. In the case where the raw material is in the form of a tablet, as being formed beforehand handling becomes easier, and therefore it is preferable. By using raw materials of many kinds, the aforesaid effects can be obtained.

[0034] The raw material may be a liquid and one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, fruit juice extract, or dairy products.

[0035] In this case, the raw material can be mixed into liquid rapidly and satisfactorily. Further, by using raw materials of many kinds, the aforesaid effects can be obtained.

## BRIEF DESCRIPTION OF THE DRAWINGS

[0036]

Fig. 1 is a section showing an original state where a bottle cap or closure member seals a bottle.

Fig. 2 is a section showing a state just before a plug is opened, by rotating a removable portion of the bottle cap.

Fig. 3 is a section showing a state just after a plug of the bottle cap has been opened.

Fig. 4 is a section showing another embodiment of a bottle cap in accordance with the present invention.

Fig. 5 is a section showing a further embodiment of a bottle cap in accordance with the present invention.

Fig. 6 is a section showing a further embodiment of a bottle cap in accordance with the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0037] In Figs. 1 through 3, an embodiment of a bottle cap or closure member in accordance with the present invention is shown. Fig. 1 is a sectional view showing a first state where a bottle cap seals a bottle. Fig. 2 is a sectional view showing a state just before a plug is opened, by rotating a movable portion of the bottle cap. Fig. 3 is a sectional view showing a state just after a plug of the bottle cap has been opened.

[0038] A bottle cap 1 is provided with a first portion 2 which is secured to a bottle and a removable second portion 3. The first and second portions are separably screwed to each other.

[0039] The first portion 2 is for supporting the remov-

able portion 3 and has an attaching portion 2a which engages a neck 11a of a bottle 11, and a through hole 2b on an axial line x.

[0040] The removable portion 3 has a cylindrical portion 4 which depends from a face 3a thereof on the axial line x and passes through the through hole 2b. The cylindrical portion 4 is a close fit in the hole 2b and acts as a plug which seals the through hole 2b when it is in the position shown in Fig. 1. The inner cylindrical portion 4 defines a chamber 5 for raw material 12 and pressurised gas 13. A lower open end 5a of the chamber 5 is sealed by a plug 6. Between the plug 6 and the fixed position 2, there exists a plug opening means 7 which is so arranged and designed that the plug 6 is opened by the plug opening means 7 during relative movements of the first portion 2 and the removable portion 3.

[0041] In the bottle cap 1, raw material 12 which has been charged into the chamber 5 is isolated from air by means of pressurised gas 13 and therefor protected against oxidation and deterioration caused by contact with oxygen in air. Therefore, it can be supplied to a consumer, with its initial freshness maintained. Also, as shown in Figs. 2 and 3, when opening the bottle 11, the chamber 5 can easily be opened by rotating the removable portion 3. As this happens, raw material 12 is discharged by means of pressurised gas 13 charged therein, so release of the material from the chamber 5 can occur smoothly.

[0042] The material of the bottle cap 1 can be polyethylene (PE). This means that it can easily be recycled. Further, by recycling, the problem of producing dioxin during incineration, which occurred with former bottle caps made of PVC, can be solved. Also if the cap material is polypropylene (PP), the same advantages during recycling can be obtained.

[0043] If the cap is made from PET or Aluminium, in addition to the aforesaid effect brought by recycling, cyclical efficiency can be increased because it is not necessary to detach the cap if the bottle is made of the same material. The bottle with the cap can be recycled as a single article and therefore it is preferable.

[0044] The plug opening means 7 comprises a flange 6a on the plug 6 which projects radially beyond the cylindrical portion 4, and a peripheral portion 2c of the through hole 2b which obstructs the passage of the flange 6a when the removable portion 3 is removed.

[0045] Thus it can be seen that the plug opening means 7 is a simple structure, thereby reducing cost, simplifying the manufacturing process.

[0046] It is preferable that the pressurised gas 13 is an inert gas.

[0047] In this way, it can maintain a safe quality of the raw material.

[0048] It is especially preferable that the pressurised gas 13 is one which is chosen from Nitrogen, Helium, Argon, CO<sub>2</sub>, NO or a mixture of two or more of these gases.

[0049] Such gases are obtainable easily at low cost

and therefore the cost of the article can be reduced.

[0050] The raw material 12 can be a powder and one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, a fruit juice extract, dairy products, alcohol, a vegetable extract, vitamins, sugar, herbs or fermented bacilli.

[0051] Such raw material is easily handled and can rapidly be mixed with liquid. Also, by using raw material of many kinds, the application range of the bottle cap 1 can be extended.

[0052] The raw material 12 can be solid and one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, a fruit juice extract, or dairy products.

[0053] Such raw material 12 is easily handled and easily charged into the chamber 5. In this case raw material 12 can be in the form of a tablet, as being formed beforehand handling becomes easier, and therefore it is preferable. By using raw materials of many kinds, the aforesaid effects can be obtained.

[0054] The raw material 12 can be liquid and one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, fruit juice extract, or dairy products.

[0055] Such raw material 12 can be mixed into a liquid rapidly and satisfactorily. Further, by using raw materials of many kinds, aforesaid effects can be obtained.

[0056] Fig. 4 is a sectional view showing another embodiment of a bottle cap or closure element in accordance with the present invention. In the following embodiment, the same symbols are used to designate parts corresponding substantially to those of the aforesaid embodiment and explanation thereof is omitted or simplified.

[0057] In the arrangement of Figure 4 bottle cap 21 comprises, in a peripheral portion 2c of the through hole 2b of the bottle cap 1, a pin member 2d which projects in parallel with an axial line x.

[0058] The pin 2d forms part of the plug opening means and is configured and positioned such that, by only rotating the movable portion 3 slightly, the chamber 5 can be rapidly opened.

[0059] Fig. 5 is a sectional view showing a further embodiment of a bottle cap or closure element in accordance with the present invention.

[0060] In the arrangement of Figure 5 bottle cap 31 has a plug opening means which is different from the plug opening means 7 of the bottle cap 1. In Figure 5 there is the fixed portion 2, the plug 6 and a connecting member 2e which connects the fixed portion 2 with the plug 6.

[0061] In the design of Figure 5, the plug 6, which rises with the rotation of the removable portion 3, can be opened by means of tension of the connecting member 2e. Also, after the opening process, as the plug 6 is con-

ected by the connecting member 2e to the fixed portion 2 it is prevented from dropping into liquid in the bottle 11. [0062] Fig. 6 is a section showing a further embodiment of a bottle cap in accordance with the present invention. The bottle cap 41 has an axially inwardly extending cylindrical portion 2c on the first portion 2 and the plug 6 is connected with the portion 2c by a connecting member 2e'.

[0063] In this arrangement when discharged from the chamber 5 directly into the liquid, the raw material 12 can be mixed into the liquid efficiently. In this bottle cap 41, the plug 6 is opened when the flange 6a engages with the cylindrical portion 2c. The connecting member 2e' is not a structural part of the opening means 7, but, after the opening process, it acts to prevent the plug 6 from dropping into the liquid.

#### EFFECTS OF THE INVENTION

[0064] According to the first bottle cap in respect of the present invention, a cylindrical or inner plug portion is provided with a chamber for raw material and pressurised gas and an opening at the other end of the chamber is sealed with a plug. Raw material charged in the chamber is isolated from air by pressurised gas and this avoids oxidation, deterioration etc. which are caused by contact with oxygen in the air. Therefore, the product can be supplied to a consumer, with its initial freshness maintained. Also, as a plug opening means exists between the plug and a fixed portion, and the plug is to be opened by the plug opening means during relative movements of the first portion and the removable portion, when opening the bottle, the chamber can easily be opened by rotating the removable portion. At this time, raw material is discharged by means of pressurised gas charged therein, so that release of the raw material from the chamber can be performed smoothly.

[0065] According to the second bottle cap in respect of the present invention as set out in claim 2, in addition to the effects brought by the first bottle cap, as the material is PE or PP, it can easily be recycled. Further, by recycling, the problem of producing dioxin during incineration, which occurred with former bottle caps made of PVC, is solved.

[0066] According to the third bottle cap in respect of the present invention as set out in claim 3, in addition to the effects brought by said first bottle cap, as the material is PET or aluminium, by recycling, it can bring same effects as of said second bottle cap. Further, cyclical efficiency can be increased because the cap and bottle can be formed from the same material and can be collected as a single article without the need to remove the cap.

[0067] According to the feature of claim 4, as the plug opening means is a simple structure, costs can be reduced, and the manufacturing process can be simplified.

[0068] According to the feature of claim 5, by only ro-

tating a movable member slightly, the chamber can rapidly be opened.

[0069] According to the feature of claim 6, the plug which rises with the rotation of the removable portion, can be opened by tension of the connecting member. Also, after the opening process, as the plug is connected to the fixed portion by means of the connecting member, it can be prevented from dropping into the liquid in the bottle.

[0070] According to the feature of claim 7, it is possible to maintain a safe quality of raw material.

[0071] According to the feature of claim 8, it is obtainable easily at low cost as an article on the market and cost can be reduced.

[0072] According to the feature of claim 9, the raw material is easily handled and can rapidly be mixed with liquid. Also, by using raw materials of many kinds, the application range of a bottle cap can be extended.

[0073] According to the feature of claim 10, the raw material is very easily handled and easily charged into the chamber. Also, by using raw materials of many kinds, the application range of the bottle cap can be extended.

[0074] According to the feature of claim 11, raw material can be mixed into liquid rapidly and satisfactorily. Also by using raw material of many kinds, the application range of the bottle cap can be extended.

#### Claims

1. A closure member for a bottle (1) comprising a first portion (2) and a removable second portion (3), said first and second portion being separably coupled with each other;

said first portion (2) being for supporting said removable portion (3) and having an attaching portion (2a) for attachment to the neck of a bottle (11), and an axial through hole (2b)

said removable second portion (3) having a depending portion (4) which extends axially through said through hole (2b), said depending portion (4) defining a chamber (5) for raw material (12) and pressurised gas (13) a lower end of said chamber (5) being closed by a plug (6), and plug opening means (7) operable when said removable portion (3) is moved relative to said first portion (2) to cause said plug (6) to open said chamber and allow discharge of the raw material into the bottle.

2. A closure member as claimed in claim 1 wherein the closure member is made either of PE (polyethylene) or PP (polypropylene).

3. A closure member as claimed in claim 1 wherein the closure member is made either of PET (polyethylene-terephthalate) or aluminium

4. A closure member as claimed in any one of claims 1 to 3, wherein said plug opening means (7) comprises a flange (6a) projecting radially from said plug beyond said depending portion (4) and a peripheral portion (2c) of said through hole (2b) which, during relative movement of the first and second portions, obstructs the passage of said flange (6a). 5
5. A closure member as claimed in claim 4, wherein said peripheral portion (2c) comprises a pin member (2d) extending in said axial direction. 10
6. A closure member as claimed in any one of claims 1 to 3, wherein said plug opening means (7) comprises a connecting member (2e) which connects said first portion (2) with said plug (6). 15
7. A closure member as claimed in any one of claims 1 to 3, wherein said pressure seal gas (13) is an inert gas. 20
8. A closure member as claimed in claim 7, wherein said pressurised gas (13) is one which is chosen from Nitrogen, Helium, Argon, CO<sub>2</sub>, NO or a mixture of two or more of these gases. 25
9. A closure member as claimed in any one of claims 1 to 3, wherein said raw material (12) is a powder and one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, fruit juice extract, dairy products, alcohol, vegetable juice extract, vitamins, sugar, herbs or fermented bacilli. 30
10. A closure member as claimed in any one of claims 1 to 3, wherein said raw material (12) is a solid one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, fruit juice extract, or dairy products. 35
11. A closure member as claimed in any one of claims 1 to 3, wherein said raw material (12) is a liquid and one which is chosen from green tea, coffee, black tea, enriched mineral, a mineral extracted from the water in the depths of the sea, healthy food, medicine, fruit juice extract, or dairy products. 40

Fig. 1

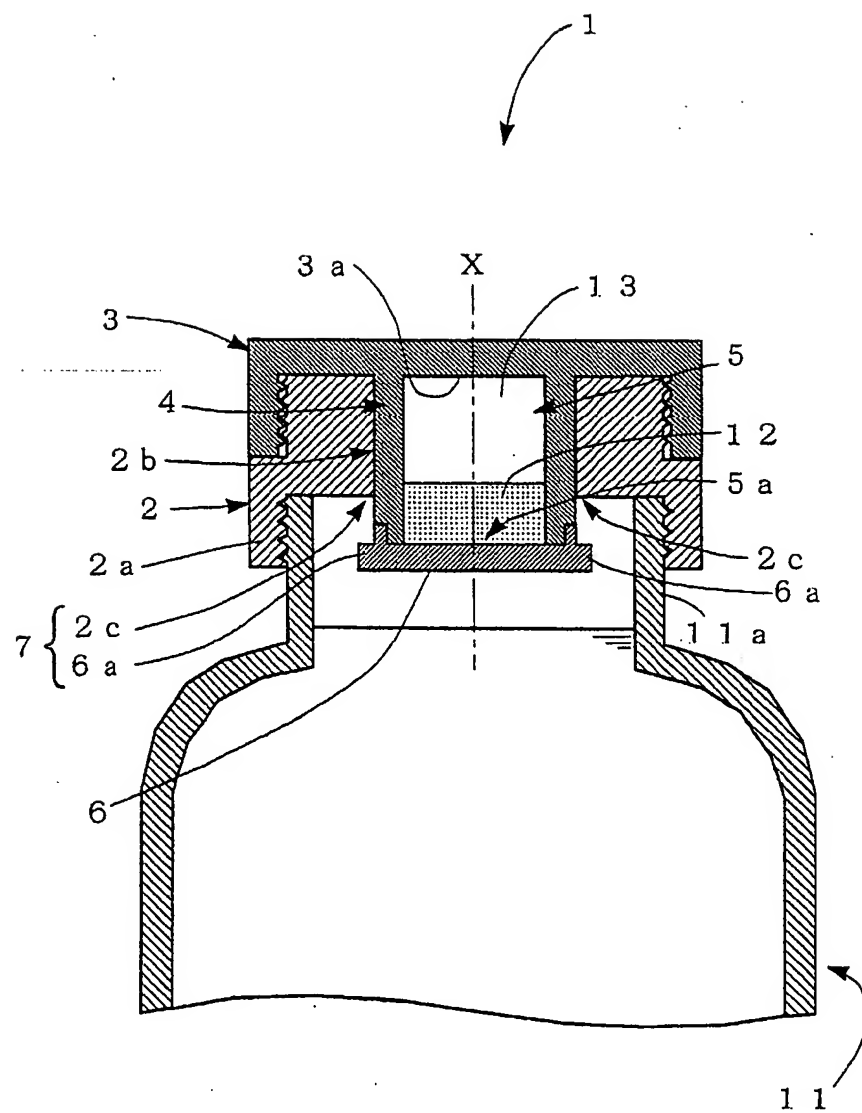


Fig. 2

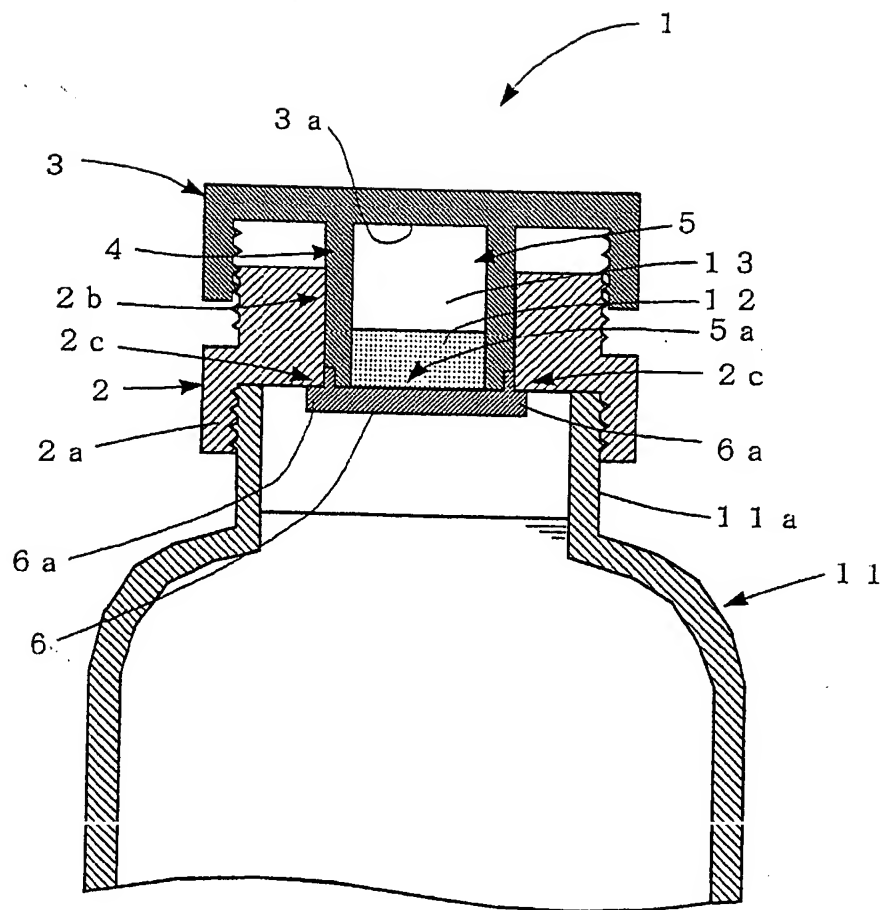




Fig. 3

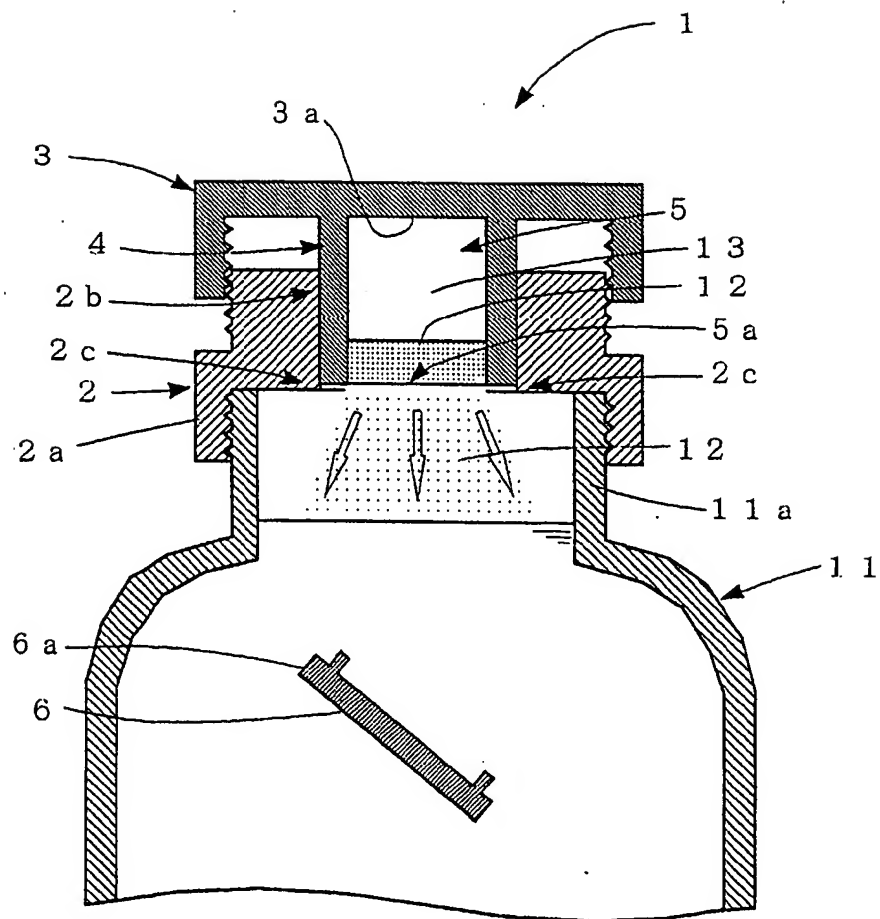


Fig. 4

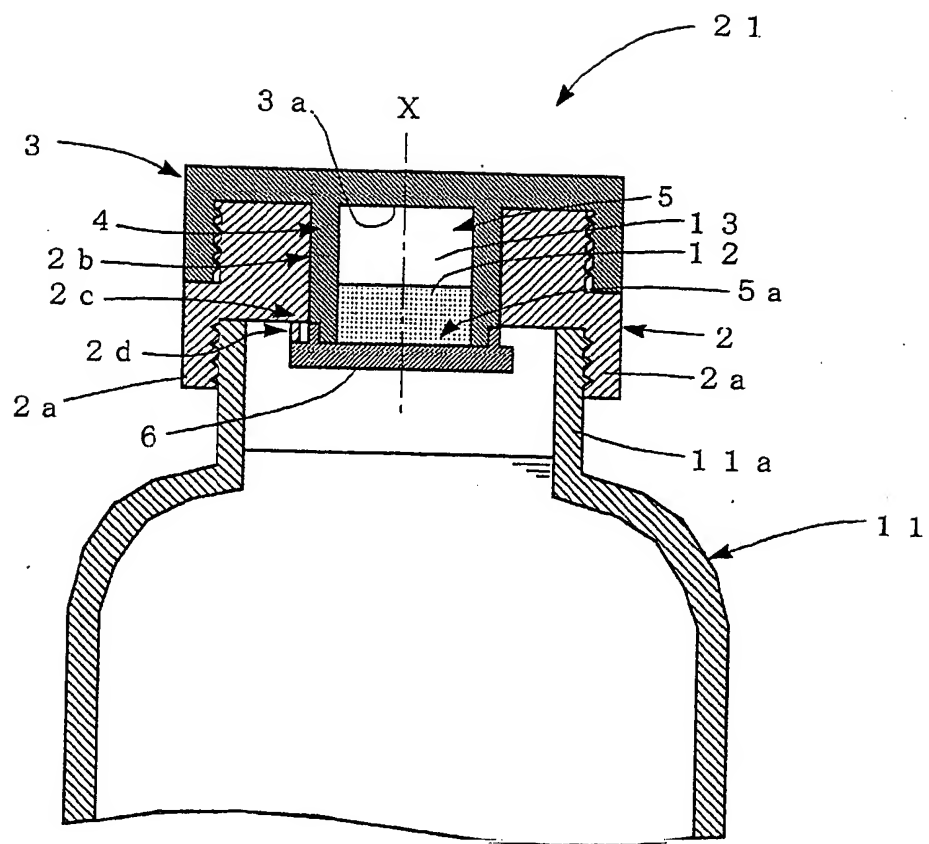


Fig. 5

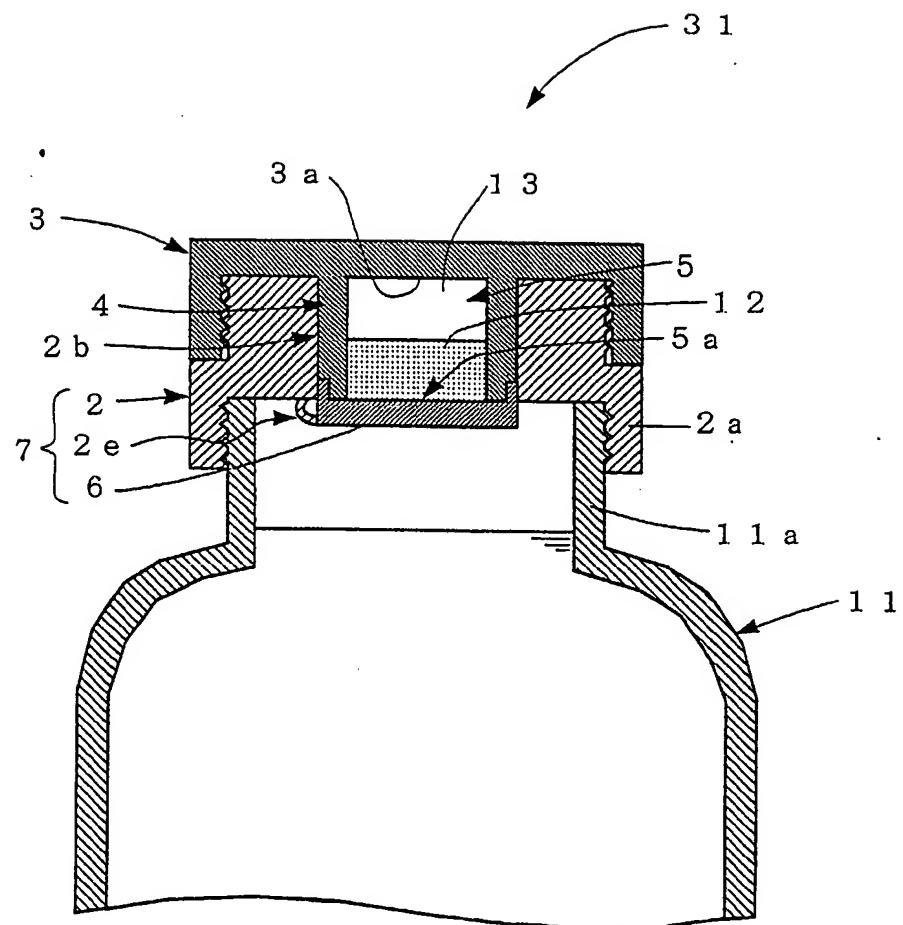
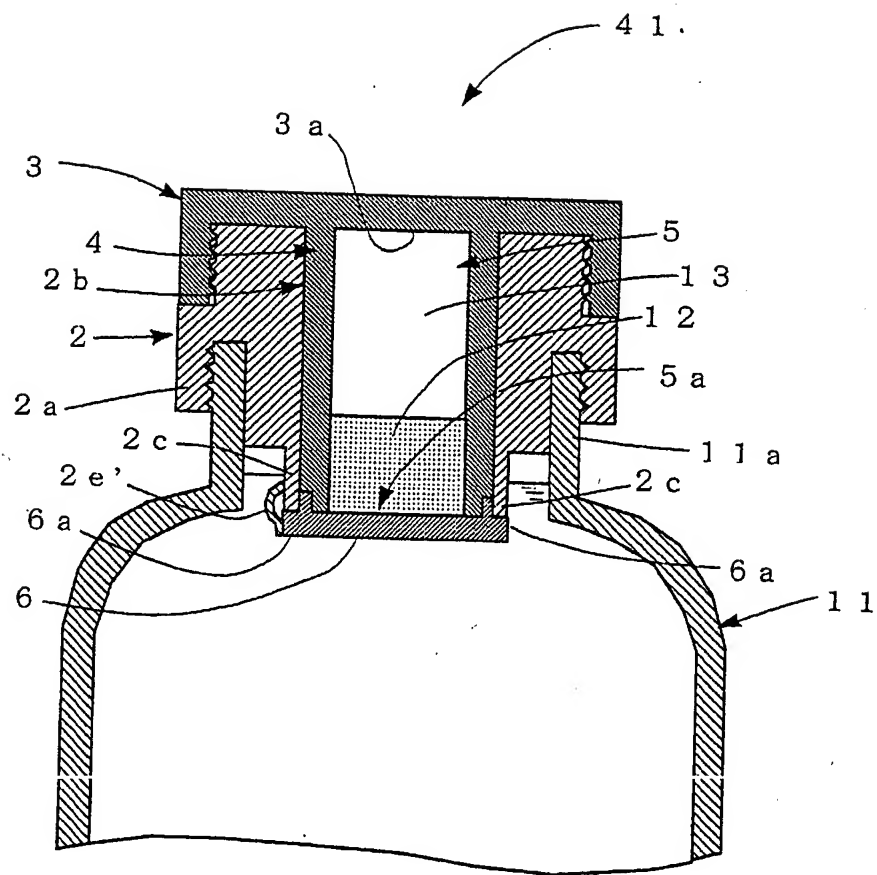


Fig. 6



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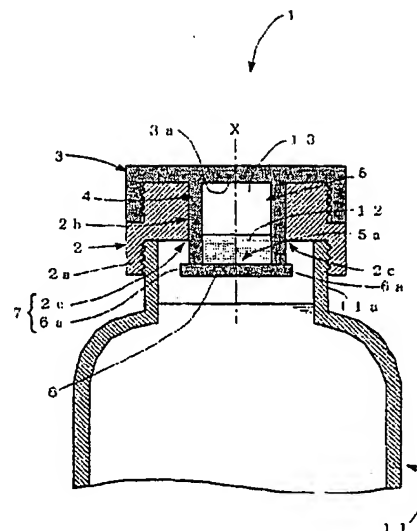
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**(54) Closure member for a bottle**

(57) A bottle cap or closure member has a first fixed portion 2 and a second movable portion 3 which are separably screwed to each other. The fixed portion is for supporting the movable portion and has an attaching portion 2a for connection to the neck 11a of a bottle 11 and a through hole 2b on an axial line X. The removable portion has an inner plug portion 4 which protrudes from a face 3a thereof on the axial line and passes through and seals the through hole. The inner plug portion is provided with a chamber 5 for raw material 12 and pressurised gas 13. An opening 5a at the other end of the chamber is sealed by a plug 6. Between the plug and the fixed portion, there exists a plug opening means 7 and the plug is arranged to be opened by the plug opening means during relative movement of the fixed portion and the removable portion.

Fig. 1

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European Patent  
Office

# EUROPEAN SEARCH REPORT

Application Number  
EP 02 25 1642

## DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	US 6 045 254 A (IGAL SHARON ET AL) 4 April 2000 (2000-04-04) * column 1, line 13 - line 15 * * column 9, paragraph 7 - paragraph 8 * * column 11, paragraph 2 * * column 18, line 29 - line 32 * * column 18, paragraph 6 *	1-4,7-11	B65D51/28 B65D81/32 B65D81/20
Y	US 4 203 517 A (STEIGERWALD FRANZ ET AL) 20 May 1980 (1980-05-20) * column 2, paragraph 10; figures 1-5 * * column 2, line 28 - line 31 * * column 2, line 31 - line 33 * * column 3, line 37 - line 39 * * column 3, paragraph 3 * * column 3, paragraph 6 * * column 4, line 59 - line 61 *	1-4,7-11	
A	EP 1 033 323 A (OREAL) 6 September 2000 (2000-09-06) * column 1, line 5 - line 6 * * column 3, paragraph 3 * * column 4, paragraph 2 * * column 4, line 24 - line 28 * * column 5, paragraph 9 * * column 6, line 57 - line 28 * * column 7, paragraph 4 - paragraph 5 * * column 9, paragraph 6 * * column 10, paragraph 4; figures 1-7 *	1-4,7-11	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65D
A	US 4 386 696 A (GONCALVES ANTONIN) 7 June 1983 (1983-06-07) * figures 1-6 *	1,4,9-11	
A	US 3 891 125 A (MORANE BRUNO ET AL) 24 June 1975 (1975-06-24) * column 5, line 24 - line 27; figures 1-3 *	1,2,4	

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The present search report has been drawn up for all claims

Place of search <b>BERLIN</b>	Date of completion of the search <b>21 November 2002</b>	Examiner <b>Nistor, L</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X: particularly relevant if taken alone  Y: particularly relevant if combined with another document of the same category  A: technological background  O: non-written disclosure  P: intermediate document</p> <p>T: theory or principle underlying the invention  E: earlier patent document, but published on, or after the filing date  D: document cited in the application  L: document cited for other reasons  S: member of the same patent family, corresponding document</p>		



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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	WO 00 78632 A (FRUTIN BERNARD D ; ROCEP LUSOL HOLDINGS (GB)) 28 December 2000 (2000-12-28) * page 4, line 7 - line 11; figures 1,2 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)

The present search report has been drawn up for all claims

Place of search <b>BERLIN</b>	Date of completion of the search <b>21 November 2002</b>	Examiner <b>Nistor, L</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document		

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